

Applicant : William A. Sirignano
Appl. No. : 10/766,132
Examiner : Sarah Sachie Clark
Docket No. : 703538.4032

Remarks

In the office action, the Examiner objected to a terminal disclaimer and drawings filed 12/7/2005, and rejected claims 1-12, 15-17 and 19-21 under 35 USC 103 as unpatentable over prior art of record, and rejected claims 1-12, 15-17, and 19-21 under the judicially created doctrine of obviousness-type double patenting over claims 1-16 of USPN 6,877,978. Applicants disagree with the Examiner's basis for these rejections and in view of the foregoing amendments and following remarks, Applicants request reconsideration and withdrawal of the Examiner's rejections. Applicant respectfully submits that Claims 1-12, 15-17, and 19-21, as amended, are in condition for allowance.

Drawings

Applicants have submitted herewith formal drawings and submit that such submission is in compliance with 37 CFR 1.121(d).

Claim Rejections – Double Patenting

Applicants have submitted a corrected terminal disclaimer herewith.

Claim Rejections – 35 USC 103

The examiner has again rejected claims 1-12, 15-17 and 19-21 under 35 USC 103. The Examiner rejected claims 1-4, 6, 7, 10-12, 15-16 and 19-21 under 35 USC 103 as unpatentable over Schirmer '118, claims 1-5, 7, 10-11, 15-16 and 19-21 as unpatentable over Meurer, claims 8-9 as unpatentable over Meurer in view of Schirmer '672, and claims 15 and 17 unpatentable over Rao. In doing so, Applicants respectfully submit that the Examiner has failed to correctly apply the second prong of *Gardner*. According to the Federal Circuit in *Gardner*, "[1] where the only difference between the prior art and the claims was a recitation of relative dimension of

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claimed device and [2] a device having the claimed dimension would not perform differently" then the claimed device is not patentably distinct. *Gardner v. TEC Sys.*, 725 F.2d 1338, 1347, 220 USPQ 777 (Fed. Cir. 1984), *cert. denied*, 469 U.S. 830, 225 USPQ 232 (1984). In considering the 2nd prong, what is relevant is the operation of the prior art device at the claimed size limitation, not whether the prior art device operates the same or similar outside of the claimed size limitation. Here, not only would a device having the claimed dimension perform differently, the devices of the cited art would fail. As a result, the claimed size limitations patentably distinguish the claimed invention, notwithstanding other differences, over the prior art because the size limitations make a significant difference in the operation of the prior art systems. *Id.*.

As previously indicated in other responses and alluded to in the specification, combustor's are not necessarily scalable downward because as the combustor is scaled downward in size, its surface area to volume ratio approaches a critical limit where quenching occurs. At the claimed dimensions, i.e., sub-centimeter lateral dimension, which are comparable to known quenching distances, the surface-to-volume ratio for the combustion chamber is so large that a flame is typically not sustainable within the chamber due to the large heat transfer losses to the chamber walls. To overcome this wall quenching phenomenon, the applicants teach and claim injecting a liquid fuel as a film that covers the entire or substantially the entire area of the chamber walls. With a liquid film applied to and maintained on the chamber walls, the heat transferred from hot combustion gases is captured by the liquid film protecting the chamber walls and, thus, preventing substantial heat loss to the chamber walls. Thus, the dimensional aspect of the claimed invention is critical to the determination of obviousness.

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Appl. No. : 10/766,132
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Docket No. : 703538.4032

Addressing the size limitation in greater detail, Schirmer '118 or Meurer each fails to teach or suggest an operable miniature combustor wherein at least one dimension of the combustor chamber is sub-centimeter and wherein the combustor includes a means for forming a film of liquid on the chamber's inner surface. Moreover, one of ordinary skill in the art would not turn to these references for a teaching relevant to the claimed invention as the operation of the apparatus of these references would tend to fail at the claimed dimensional limitations, and based on the teaching of these references, would not be motivated to modify them and scale them to claimed size limitation absent the inappropriate use of hindsight.

In rejecting claims under 35 U.S. C. § 103, it is incumbent upon the examiner to establish a factual basis to support the legal conclusion of obviousness. See *In re Fine*, 837 F.2d 1071, 1073-74, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). In so doing, the Examiner is expected to make the factual determinations set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 17,148 USPQ 459, 467 (1966), and to provide a reason why one having ordinary skill in the pertinent art would have been led to modify the prior art or to combine prior art references to arrive at the claimed invention. Such reason must stem from some teaching, suggestion or implication in the prior art as a whole or knowledge generally available to one having ordinary skill in the art. *Uniroyal, Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 1051, 5 USPQ2d 1434, 1438 (Fed. Cir. ____), cert. denied, 488 U.S. 825 (1988); *Ashland Oil, Inc. v. Delta Resins & Refractories, Inc.*, 776 F.2d 281, 293, 227 USPQ 657, 664 (Fed. Cir. 1985), cert. denied, 474 U.S. 1017 (1986); *ACS Hosp. Sys., Inc. v. Montefiore Hosp.*, 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984). These showings by the Examiner are an essential part of complying with the burden of

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presenting a prima facie case of obviousness. Note In re Oetiker, 997 F.2d 1443, 1445 , 24 USPQ2d 1443, 1444 (Fed. Cir. 1992).

The examiner fails to provide a reason why one having ordinary skill in the pertinent art would have been led to modify Schirmer '118 or Meurer to arrive at the claimed invention. Such reason must stem from some teaching, suggestion or implication in Schirmer '118 or Meurer or the art as a whole or knowledge generally available to one having ordinary skill in the art. As indicated above, one skilled in the art would understand that heat loss to the combustor wall is critical at the claimed size limitation and likely to result in an inoperable combustor due to quenching. Thus, when Schirmer '118 or Meurer are viewed as whole, it becomes readily apparent that one skilled in the art would not be led to modify either of these references.

Specifically, both references teach the cooling of the chamber wall resulting in heat loss to the combustion chamber. In Schirmer '118 the chamber wall is cooled by transferring the heat of combustion from the combustion chamber absorbed by the wall to a liquid fuel circulating in another chamber 18 formed about the combustion chamber wall 15, along with the transfer of heat to the liquid fuel as it passes through a multitude of pores in the porous wall material. One skilled in the art would effectively be deterred from modifying Schirmer '118 in light of the substantial heat loss through the chamber wall that would cause quenching (inoperability) at the claimed dimension limitation.

Similarly, in Meurer the chamber wall is cooled by passing air over the chamber wall through a passage 12 about the chamber wall. Thus, one skilled in the art would likewise be effectively deterred from modifying Meurer in light of the substantial heat loss through the chamber wall that would cause quenching (inoperability) at the claimed dimension limitation.

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Docket No. : 703538.4032

Therefore, the examiner cannot establish a prima facie case of obviousness using Schirmer or Meurer, alone or in combination.

Independent amended Claim 15 recites a combustion process that includes "injecting a liquid fuel," "forming and maintaining a liquid fuel film over substantially an entire interior surface of the chamber" wherein the combustion chamber comprises "a lateral dimension transverse to a major flow direction within the chamber that is sub-centimeter." The Examiner rejected Claims 15 and 17 under 35 USC 103 as being unpatentable over Rao (US 4604988).

In addition to the requirements noted above in establishing a prima facie case of obviousness, where the reference is not in the field of the applicant's endeavor, it must be reasonably pertinent to the problem with which the inventor was concerned in order to rely on that reference as a basis for rejection. In re Oetiker, 977 F.2d 1443, 1447 (Fed. Cir. 1992). References are selected as being reasonably pertinent to the problem based on the judgment of a person having ordinary skill in the art. Id. ("[I]t is necessary to consider 'the reality of the circumstances,'—in other words, common sense—in deciding in which fields a person of ordinary skill would reasonably be expected to look for a solution to the problem facing the inventor." (quoting In re Wood, 599 F.2d 1032, 1036 (C.C.P.A. 1979))). Thus, this inquiry looks to whether a skilled artisan would have been motivated to modify the reference by defining the prior art relevant for the obviousness determination, and that it is meant to defend against hindsight. See id.; In re Clay, 966 F.2d 656, 659-60 (Fed. Cir. 1992).

Rao considers a situation in his vortex device where the liquid is not the fuel or a chemical reactant. Thus, Rao is directed to non-analogous art and absent the inappropriate use of hindsight, cannot be used to establish a prima facie case of obviousness.

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Accordingly, claims 1-12, 15-17, and 19-21 meet the requirements for patentability under 35 USC 103.

Conclusion

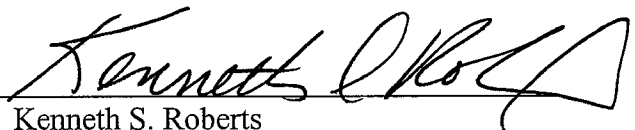
Applicant submits that the claims are in condition for allowance. Should the Examiner have any questions regarding this Amendment, he is invited to call the undersigned attorney at (949) 567-6700.

Respectfully submitted,

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